

## DETAILED ACTION

### ***Status of Application***

Claims 1-26 are pending and presented for examination.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-6, 9-14, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dehoff et al. (US5691905) in view of Schulman et al. (US2002/0064745).

In regards to claim 1, Dehoff teaches a method of forming dental molded articles, comprising forming a three-dimensional digital model of a tooth or prosthesis to be formed, automatically generating a dental mold using an automated milling machine, forming at least first and second enamel molded

articles (coquille) having a hollow space (see figure 8). The reference teaches further polishing of the outside enamel layer and teaches utilizing a substantially constant enamel thickness, thus necessarily providing for an offset (see col 7, ln 14-55).

Schulman teaches forming a dental shell (coquille) utilizing a digital model, forming the shell with a hollow space, and filling said space with a metal to form a coping (see claim 16). The reference teaches where said coping may be in the shape of a bridge, crown, cylinder, pin or connector (see claim 17).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Dehoff to fill a hollow space of a coquille with a hardenable material as taught by Schulman, in order to form a connector or pin to join a dental part with a base or receptor, thus increasing the industrial applicability of the invention.

In regards to claims 2-6, Dehoff teaches forming an offset (see rejection of claim 1 above). It would necessarily follow that said offset be provided over the entire surface of the model. Furthermore, the reference appreciates the thickness of an offset will depend on the form to be produced. It would have been obvious to one of ordinary skill in the art to optimize the size of an offset based on a part to be molded, or the materials used, in order to ensure sufficient material to form the desired dental part after molding and polishing steps, thus maximizing the industrial applicability of the invention.

In regards to claims 9-12, Dehoff teaches the use of automated milling machines to form coquilles based on a predetermined three-dimensional model of a dental part (see above).

In regards to claim 13, Schulman teaches the production of at least one inlet channel formed into a coquille blank (see figures 5 and 6). It would have been obvious to one of ordinary skill in the art utilize an inlet channel as taught by Schulman in order to form a molded coquille part.

In regards to claim 14, Dehoff teaches a finishing step comprising polishing and/or material removal. It would have been obvious to one of ordinary skill in the art to place the molded article as taught by Dehoff in view of Schulman in a machine for such a finishing step, in order to enhance the quality and surface of a dental part.

In regards to claims 18-19, the references teach such automated milling processes (see above).

4. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dehoff in view of Schulman as applied to claim 1 above, and further in view of Wolf et al. (US6970760).

In regards to claims 7-8, the references fail to teach optical measurements of a tooth stump in order to form a digital model and produce the molded part.

Wolf teaches a method of making a dental prosthesis comprising forming a digitized model of a tooth stump in order to form a prosthesis through an automated machining tool (see claim 1).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Dehoff in view of Schulman to form a digitized model of a tooth stump as taught by Wolf, using optical measurement in order to form a dental part uniquely fitted to a patient's tooth stump, thus increasing quality, and maximizing the industrial applicability of the invention.

5. Claims 15-17 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dehoff in view of Schulman as applied to claims 1 and 14 above, and further in view of Bodenmiller et al. (US2002/0125619).

In regards to claims 15-17 and 20-23, the references fail to teach exactly repositioning a coquille, wherein the coquille serves as support or mounting material, and surrounding a part with a milling wax or bedding mass. Regarding claim 20, all other limitations are addressed in the rejection of claim 1 above.

Bodenmiller teaches a method of forming a dental part coquille having a hollow space using a milling machine, wherein said coquille is exactly repositioned, wherein said coquille serves as support material, and the use of milling wax or bedding mass (see [0035]-[0039]).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Dehoff and Schulman to utilize a milling process as taught by

Bodenmiller in order to enhance the quality of a coquille part, to maximize the efficiency of a milling apparatus, and increase the industrial applicability of the invention.

6. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dehoff in view of Schulman as applied to claim 1 above, and further in view of Jones (US4175953).

In regards to claim 24, Dehoff teaches the use of metal but does not specifically teach the use of a noble metal alloy. Jones teaches that gold alloys (noble metal alloy) are well known and desirable in the art of dental prosthetic parts (see col 1, ln 15-28). It would have been obvious to one of ordinary skill in the art to utilize a well known material, such as a gold alloy, due to desirable physical characteristics in dentistry such as low melting temperature, ductility and ability to form impact resistant ceramic to metal bonds (see col 1, ln 15-28).

In regards to claims 25-26, Jones teaches the use of non-precious metal alloys in dental prosthetics such as crowns and bridges having good polish-ability, comprising cobalt, chromium and molybdenum, and free of iron (see claim 1). It would have been obvious to one of ordinary skill in the art utilize an alloy as taught by Jones in order to reduce costs while maintaining good polish-ability, thus increasing the industrial applicability of the invention.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN A. HEVEY whose telephone number is (571)270-3594. The examiner can normally be reached on Monday - Friday 8:00 AM to 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. A. H./  
Examiner, Art Unit 1793

/Kevin P. Kerns/  
Primary Examiner, Art Unit 1793